CHAPTER IV
CONCLUSION

4.1 Conclusion

Four novel water-soluble salicylyl fluorene derivatives (**F1-F4**) were successfully synthesized by means of Suzuki and Sonogashira coupling reactions. These compounds were characterized by NMR spectroscopy, mass spectrometry, UV-Vis and fluorescence spectrophotometry. From the photophysical properties measured in phosphate buffer saline pH 8.0 solution, the maximum absorption wavelengths of these compounds were around 304-330 nm. However, only **F1** and **F2** exhibit a distinct fluorescence signal with the maximum emission wavelengths around 420-430 nm, whereas **F3** and **F4** are non-emissive due to the ICT effect of salicylic acid group and PET effect of carbonyl group of the fluorenone, or the ICT effect of the dicyanovinyl group. A large geometrical difference between the ground and excited state in **F1** may be responsible for it larger Stokes' shift and lower quantum yield compared to **F2**. The selectivity screening suggested that **F2** has a potential to be a chemosensor for Fe^{2+} and Cu^{2+}. This selectivity was further improved towards Fe^{2+} simply by addition of Triton X-100. Under the optimal conditions, the Stern-Volmer of 4.08×10^{6} M^{-1} and a detection limit of 1.47 ppb were achieved. Preliminary results also suggested a possibility for fabrication of **F2** onto a solid-state sensor. Nonetheless, without the surfactant this solid-state sensor shows selectivity towards Fe^{2+} as well. When the concentration of **F2** in THF is at 50 μM, both Cu^{2+} and Fe^{2+} at 40 pmol can be detected using this sensor.